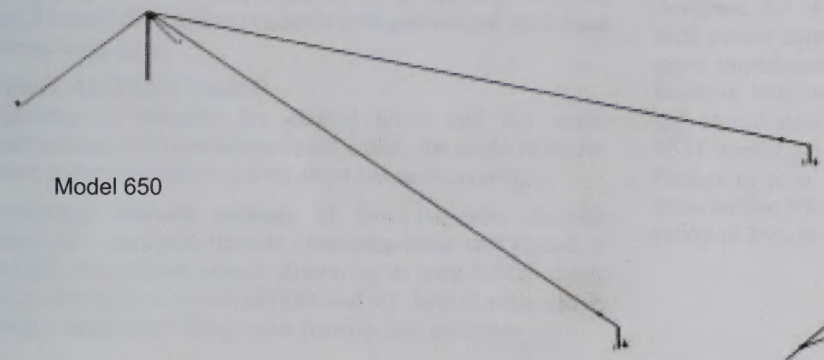
TCI

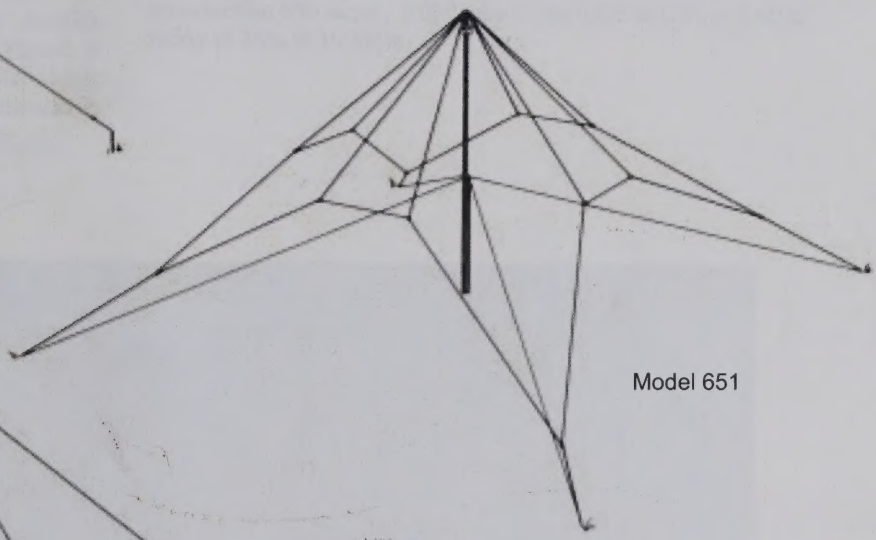
SERIES

650

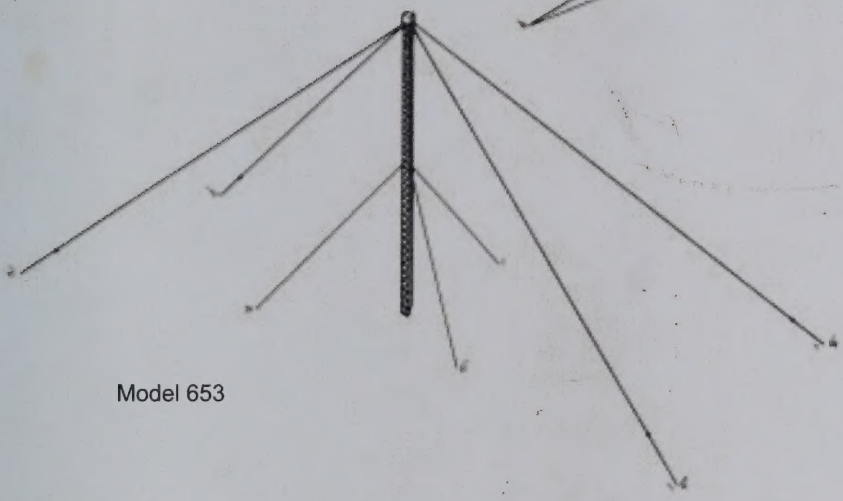
Tactical Antennas



Model 650



Model 651



Model 653

The 650 series of tactical antennas is designed to provide the communicator with a group of antennas covering the full 2–30 MHz band to meet most tactical range requirements. The three basic designs, illustrated above, are all available in transportable form, sharing the same strong but lightweight fittings and aluminum masts. The "fixed" or "F" version is intended for permanent or semi-permanent installation on concrete foundations and is, therefore, equipped with a galvanized steel mast and heavier Alumoweld wire radiators and guy wires. Transportable versions employ phosphor bronze wire for curtain, catenaries and layout ground wires, and polypropylene rope for mast guys. Great care has been taken to design these antennas not only for optimum performance consistent with their size and intended application, but also for ease in handling and installation. No tuners are required for these antennas; resistive terminations are employed to improve broadband impedance matching.

- **2 to 30 MHz band**
- **No tuning units**
- **Easy and rapid installation**
- **Rugged construction**
- **Transportable (T) and Fixed (F) versions**

650T and F

Commonly terms the "sloping 'V'," this antenna is intended for longer range communications and is the largest of the 650 series. It covers the full 2–30 MHz band. Design studies show that the optimum angle at the apex of the 'V' for maximum gain and low TOA is approximately 30 degrees with a 500 ft length for radiator wires. The corresponding dimensions and gain/TOA are shown in the tables. Typical radiation patterns are also shown. Loading resistors are used at the ends of the V to give a unidirectional radiation pattern. Efficiency is below 10% at 4 MHz and is a maximum of 40% from 27 MHz–30 MHz.

The Model 650 is supplied in transportable form with a lightweight 50 ft aluminum mast in 10 ft sections. A fixed version, Model 650F, is also available with galvanized steel mast and Alumoweld guys.

651T (MIL AS-3791/G) and F

The antenna is intended for ground wave and sky wave communications with omnidirectional cover; the application for sky wave communications is over short-to-medium ranges.

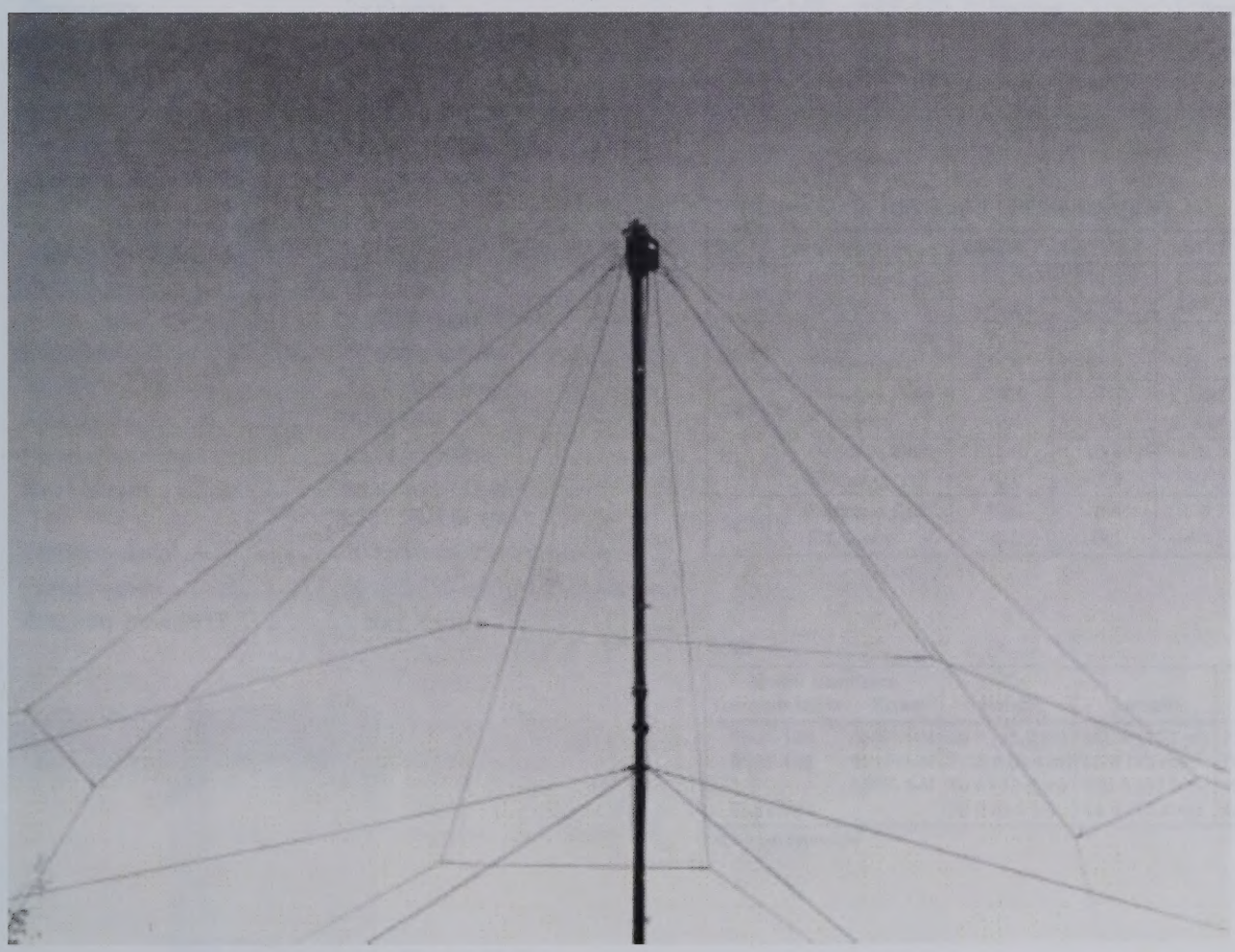
The radiating element consists of two fan-delta curtains supported on a common tubular aluminum mast and placed at 90° to each other. Each delta is driven by its own balun which, in tune, is driven by a power divider and 90° hybrid network. A lightweight aluminum tilt-up mast permits fast erection.

A special feature of the Model 651 is the care taken to provide EMP protection in accordance with the requirements of DRCPM-8223. This protection is given by good grounding, the use of pulse arrestors across the balanced terminals of the matching units, and a robust design able to withstand high voltages with a margin of safety.

These features and the construction materials make the antenna fully suitable for military and emergency type applications.

653T and F

In transportable and fixed versions, the 653 is a four-wire broad band dipole 2–30 MHz with omnidirectional coverage. It is designed for short-medium range sky wave communications with power handling up to 1 kW Avg./2 kW PEP. To provide a good impedance match over 2–30 MHz, the antenna employs resistive terminations at each corner. The fixed version has a galvanized steel mast height of 40 ft; the transportable version 653T employs a 20 ft, lightweight, aluminum mast with special fittings of ease of erection and movement as described at the introduction 650 series. Efficiency of the 653F is 13% at 4 MHz rising to 28% at 10 MHz.



Model 651T fully erected. Balun transformer is mounted at top of the mast.

Specifications

Model 650T & F

Polarization ..... Horizontal
Impedance ..... 50 ohms nominal
VSWR ..... 2.5:1 maximum
Frequency ..... 2–30 MHz
Power Handling ..... See Box
Mast Height ..... 50 ft (15.2m)
Environmental ..... 100 mi/h (160 km/h) no ice
Performance
Erection Time 650T ..... 2 hours, 4 men
Take-off Angle .....

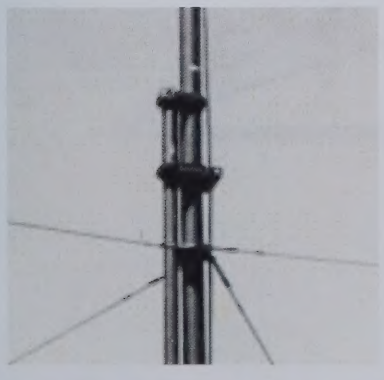
Freq.	TOA
2 MHz	48°
4 MHz	33°
10 MHz	18°
16 MHz	14°
28 MHz	8°

Model 651T (MIL AS-3791/G) & F

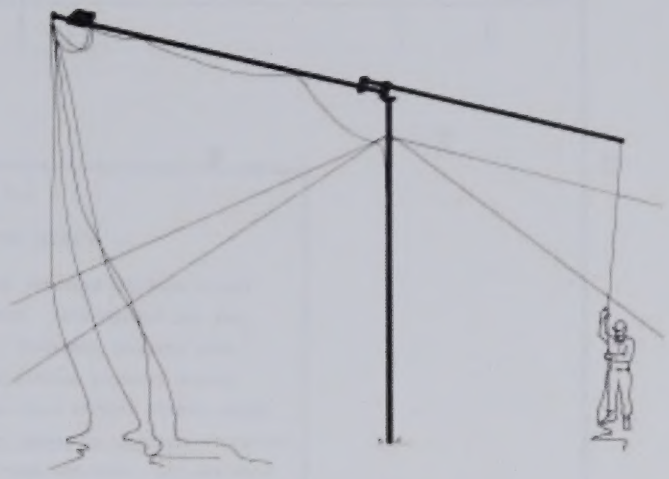
Polarization ..... Vertical, Horizontal Component
Impedance ..... 50 ohms nominal
VSWR ..... 1.5:1 maximum
Frequency ..... 2–30 MHz
Power Handling ..... 400 Watts Avg/PEP
Mast Height ..... 27.5 ft (8.4m)
Environmental ..... 100 mi/h (160 km/h) no ice
Performance ..... 60 mi/h (96 km/h) 1/2" radial ice
Erection Time 651T ..... 1 hour, 4 men

Model 653T & F

Polarization ..... Horizontal, Vertical Component
Impedance ..... 50 ohms nominal
VSWR ..... 2.5:1 maximum
Frequency ..... 2–30 MHz
Power Handling ..... 1 kW Avg/PEP
Mast Height ..... 653F 40 ft (12.2m) 653T 20 ft (6.1m)
Environmental ..... 100 mi/h (160 km/h) no ice
Performance ..... 60 mi/h (96 km/h) 1/2" radial ice
Erection Time 651T ..... 1 hour, 4 men



Model 651T
Detail of twin mast center hinge, locked in fully erect position.



Model 651T Erection Procedure.
Note that the bottom sections of the tubular mast are fully guyed and secure before the upper hinged mast and radiators are pulled into position.

Power

Model Number Transportable	Model Number Fixed	Power Average	Power PEP	Connector
650T-1-02	650F-1-02	Receive		Type N Female
650T-1-06	650F-1-06	1 kW	2 kW	Type N Female
650T-1-03	650F-1-03	10 kW	10 kW	1-5/8" EIA Female
651T-1-35	651F-1-35	400 Watt	400 Watt	Type N Female
653T-1-06	653F-1-06	1 kW	2 kW	Type N Female

Directive Gain (dBi) and Efficiency (dB)

Frequency		650T & F	651T & F	653T	653F
2 MHz	Directive Gain	8.3	4.5	5.0	5.1
	Efficiency	–22.0	–22.8	–34.5	–19.6
4 MHz	Directive Gain	10.6	3.5	5.2	4.7
	Efficiency	–15.6	–15.0	–21.7	–8.9
10 MHz	Directive Gain	14.3	7.2	6.3	6.6
	Efficiency	–9.1	–6.6	–9.4	–5.6
16 MHz	Directive Gain	15.6	6.6	6.0	8.5
	Efficiency	–6.6	–3.8	–7.3	–4.4
28 MHz	Directive Gain	15.5	8.4	6.7	8.6
	Efficiency	–3.9	–3.1	–4.7	–3.6

Size

Model Numbers Transportable	Model Numbers Fixed	Height	Length	Width
650T-1-N	650F-1-N	50 ft (15.2 m)	560 ft (170 m)	259 ft (80 m)*
651T-1-N	651F-1-N	27.5 ft (8.4 m)	76 ft (23 m)	76 ft (23 m)
	653F-1-N	40 ft (12.2 m)	110 ft (33.5 m)	40 ft (12.2 m)
653T-1-N		20 ft (6.1 m)	44 ft (13.4 m)	44 ft (13.4 m)

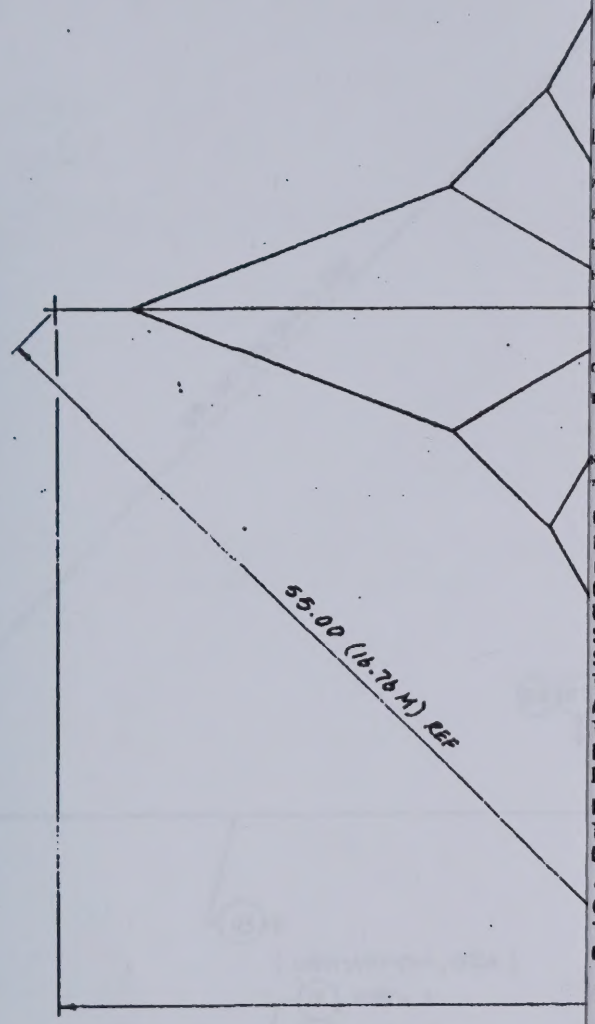
* At 30° Leg Separation

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

A R N I N G ! !

EED BEFORE READING —

ASTS AND ANTENNAS REQUIRES HIGHLY
XPERIENCE. THIS DRAWING AND THE
UKE THAT PERSONNEL INVOLVED HAVE
NSTALLED SIMILAR PRODUCTS BEFORE.
O INSTALL THIS ANTENNA WITHOUT THESE
TCI CAN ASSUME NO LIABILITY IF FAULTY
ON PRACTICES ARE USED. TCI HAS FAC-
TO ASSIST IN INSTALLATION, MAINTENANCE
CONTACT YOUR TCI REPRESENTATIVE IF
NCE IS REQUIRED.



REMOVE REELS 1 AND 2 FROM THE EQUIPMENT BAG. EACH CONTAINS TWO RADIATOR ASSEMBLIES ITEMS 14, 15, 16, AND 17. EACH IS TO BE ATTACHED TO THE TOP OF THE MAST ON ONE END AND AN ANCHOR BOLT ON THE OTHER. STARTING WITH REEL 1, ATTACH THE WIRE LOOP NEAREST THE PIGTAIL TO THE SMALL SNAP HOOK ATTACHED TO THE INSULATORS AT THE TOP OF THE MAST. STRETCH OUT THE WIRE ON THE REEL ALONG THE MAST UNTIL THE END OF THE WIRE IS REACHED. REPEAT WITH THE SECOND WIRE ON THIS REEL AND THE TWO WIRES ON REEL 2, ATTACHING ONE WIRE LOOP TO EACH OF THE FOUR INSULATORS AT THE TOP OF THE MAST. ATTACH THE FOUR PIGTAILS TO THE FOUR MOUNTING SCREWS ON THE TERMINAL PLATE ON THE BOTTOM OF THE BALUN BOX. SEE DETAIL D-D ON SHEET 3.

REMOVE THE RG 8/U COAX FROM THE EQUIPMENT BAG. ATTACH ONE END TO THE BALUN AT THE TOP PLATE. ATTACH THE OTHER END TO THE FITTING ON THE BOTTOM MAST SECTION, ITEM 7.

ATTACH THE MAST GROUND WIRE, PART OF ITEM 6, TO THE GROUND CLAMP ON THE GROUND STAKE, ITEM 28. ATTACH THE GROUND WIRE AND COAXIAL CABLE, ITEM 24, TO THE MAST USING THE STRAPS ON EACH MAST SECTION.

ATTACH ERECTION ROPE ITEM 21 TO LOWER HANDLE ASSEMBLY, 11.

ERECT THE MAST TO ITS INTERMEDIATE POSITION BY GUIDING AND LIFTING THE TOP OF THE MAST TOWARD THE CENTER WHILE GUIDING AND ERECTING THE LOWER PART OF THE MAST. TAKE CARE NOT TO ENTANGLE THE CURTAIN LINES. THE SIDE GUY LINES PREVENT THE MAST FROM FALLING TO EITHER SIDE (DETAIL 5). WHEN THE MAST IS ERECT IN THE INTERMEDIATE POSITION (DETAIL 6), STRETCH OUT AND TIE DOWN THE FORWARD AND AFT GUY ROPES AS BEFORE. ADJUST ALL FOUR GUY ROPES FOR PROPER TENSION AND MAST STRAIGHTNESS.

COMPLETELY ERECT THE MAST BY PULLING THE ERECTION ROPE UNTIL THE HANDLE CAN BE REACHED (DETAIL 7 AND 8). THE TOP OF THE MAST SHOULD BE GUIDED, BY HAND, AS HIGH AS POSSIBLE SO THAT THE BALUN DOES NOT TANGLE IN CURTAIN OR GUY ROPES. CONTINUE TO ERECT THE MAST UNTIL THE HANDLE IS IN CONTACT WITH THE LOWER PART OF THE MAST. ENGAGE THE LOCKING CLAMP ASSEMBLY AND SECURE THE HANDLE IN THE "UP" POSITION AGAINST THE MAST.

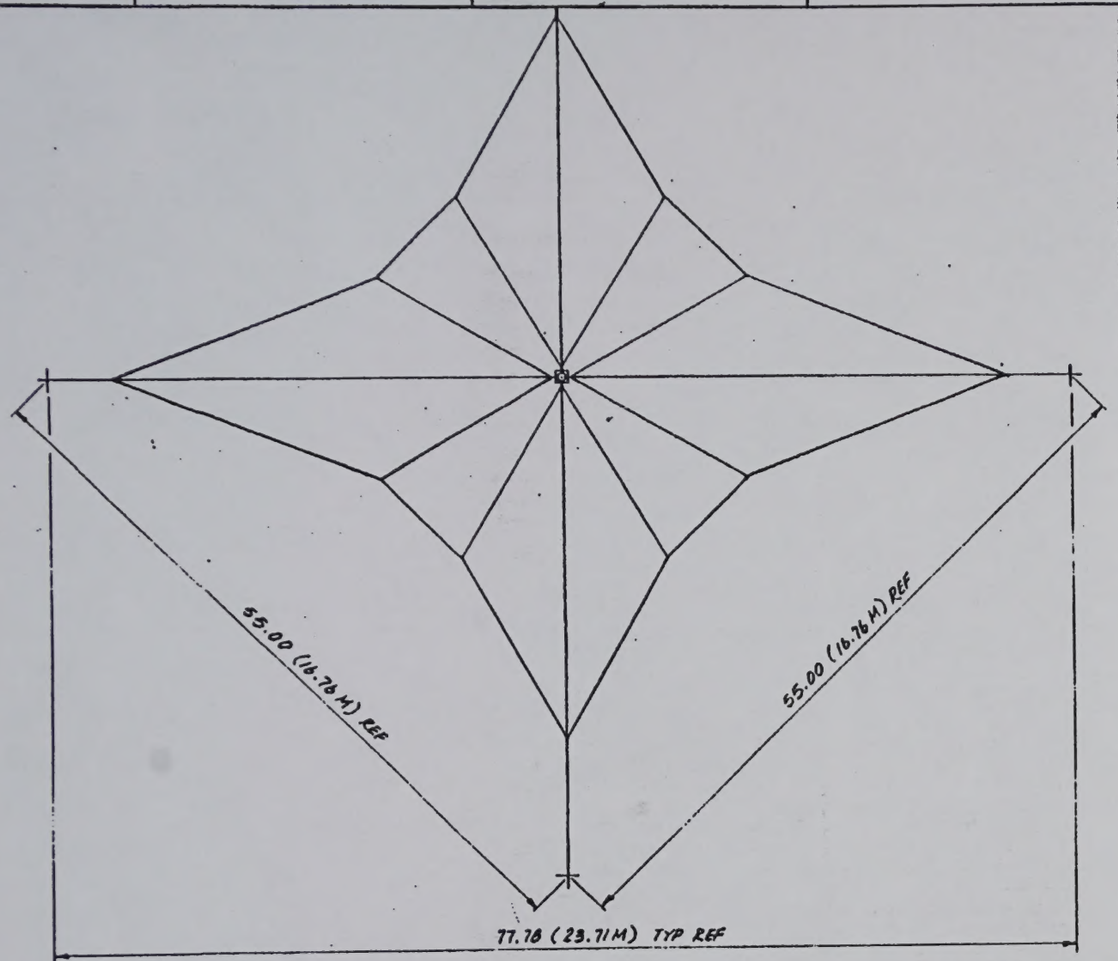
(NOTES CONTINUED ON SHT. 2)

ELEVAT

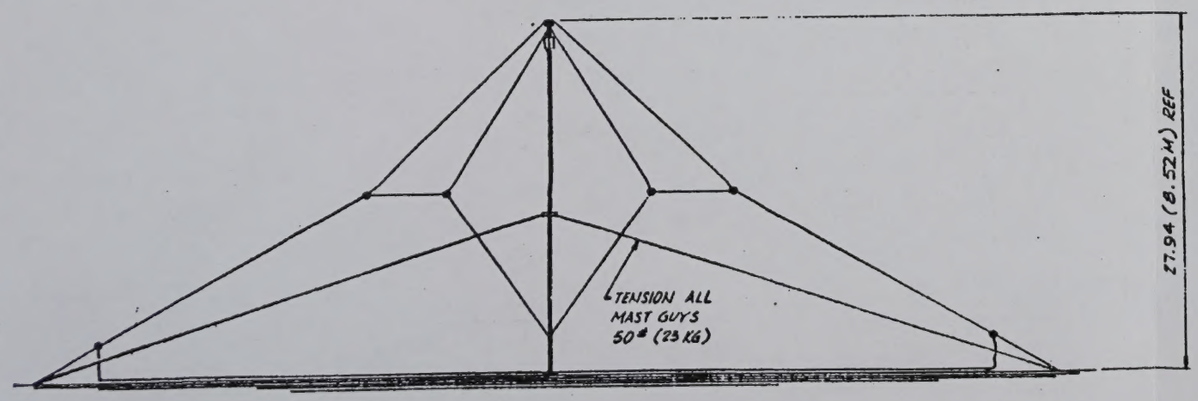
PART NUMBER	DESCRIPTION	ITEM NO.
PARTS LIST		

DATE 3/4/84	TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA	
DATE 12-20-84	TITLE ANTENNA INSTALLATION MODEL 651T-1-35 TRANSPORTABLE	
DATE 12-31-84		
DATE 4/18/85		
SCALE DRAWING	SIZE D / FSCM NO. 30103 / DWG NO. 589-ANT-00T	
	SCALE NONE / RELEASE DATE	SHEET 1 OF 5

REV. E | DWG NO. 589-ANT-00T



PLAN VIEW



ELEVATION VIEW

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

!! WARNING !!

— DO NOT PROCEED BEFORE READING —

INSTALLING AND RIGGING MASTS AND ANTENNAS REQUIRES HIGHLY SPECIALIZED SKILLS AND EXPERIENCE. THIS DRAWING AND THE INSTRUCTIONS WITHIN ASSUME THAT PERSONNEL INVOLVED HAVE THESE SKILLS AND HAVE INSTALLED SIMILAR PRODUCTS BEFORE. NO ONE SHOULD ATTEMPT TO INSTALL THIS ANTENNA WITHOUT THESE SKILLS AND EXPERIENCE. TCI CAN ASSUME NO LIABILITY IF FAULTY OR DANGEROUS INSTALLATION PRACTICES ARE USED. TCI HAS FACTORY TRAINED PERSONNEL TO ASSIST IN INSTALLATION, MAINTENANCE OR DISASSEMBLY. PLEASE CONTACT YOUR TCI REPRESENTATIVE IF CONSULTATION OR ASSISTANCE IS REQUIRED.

INSTALLATION INSTRUCTIONS:

SITE LAYOUT (SEE LAYOUT DETAIL)

1. SELECT AN OPEN AREA APPROXIMATELY 55 FT. (16.8M) x 55 FT. THE SITE SHOULD BE LEVEL AND CLEAR OF VEGETATION IF POSSIBLE.
2. DETERMINE THE APPROXIMATE CENTER OF THE SITE. REMOVE THE BASE PLATE, ITEM 6, FROM THE EQUIPMENT BAG. POSITION THE BASE PLATE OVER THIS CENTER. ANCHOR THE BASE PLATE TO THE SOIL WITH FOUR ANCHOR STAKES, ITEMS 27(3) AND 28 (1).
3. MAST SECTIONS ARE NUMBERED 4, 3, 2, 1, A, B, C & D, AND ARE ASSEMBLED IN THAT ORDER BOTTOM TO TOP. ASSEMBLE THE MAST ON THE GROUND PER SHEET 3 OF SITE LAYOUT. NOTE ORIENTATION OF BOTTOM SECTION OF MAST (DETAIL 4, NO. 4.)
4. REMOVE THE TWO BARE COPPER GROUND WIRES (ITEM 18) FROM THEIR REELS- ONE IS ON REEL 1, THE OTHER IS ON REEL 2. (SEE DETAIL 1, SHEET 2.)
5. LOCATE THE APPROXIMATE CENTER OF EACH GROUND WIRE (AREA BETWEEN COPPER SLEEVES) AND ATTACH THIS POINT TO THE MOUNTING PLATE ON THE BASE PLATE USING THE WING NUT TO TIGHTEN AND HOLD THE WIRES. THE WIRES SHOULD BE STRETCHED OUT ALONG THE GROUND AS SHOWN IN THE SITE LAYOUT.
6. PULL THE GROUND WIRE TAUT TOWARDS POSITION 3 OF THE SITE LAYOUT. LOCATE A GROUND ANCHOR AT THIS POINT USING THE MAST AS A GUIDE TO ALIGN THE WIRE. STRETCH OUT THE OTHER END OF THE GROUND WIRE IN LINE WITH THE MAST TOWARDS POSITION 2 OF THE SITE LAYOUT. LOCATE A GROUND ANCHOR AT THIS END ALSO. FASTEN THE LAYOUT WIRE, ITEM 19, AT POSITION 3. STRETCH THE WIRE TOWARD POSITION 4, USING THE GROUND WIRE AND THE LAYOUT WIRE, LOCATION POSITION 4, POUND IN A GROUND ANCHOR, ITEM 26. REPEAT FOR POSITION 5. LEAVE THE GROUND WIRES ON THE GROUND - THEY WILL BE ATTACHED IN STEP 18.
7. UNCOIL FOUR GUY ROPES, ITEM 20. ATTACH SMALL SNAP HOOK TO GUY ATTACH PLATE IN THE APPROXIMATE CENTER OF THE MAST.
8. HOOK THE TWO SIDE GUY ROPES TO THE GROUND ANCHOR EYES WITH THE LARGE SNAP HOOK. WRAP THE ROPE AROUND THE OTHER LARGE SNAP THREE OR FOUR TIMES AS SHOWN IN DETAIL 11 TO FORM AN ADJUSTABLE LOOP. (SEE SHEET 2 OF SITE LAYOUT.)
9. REMOVE REELS 1 AND 2 FROM THE EQUIPMENT BAG. EACH CONTAINS TWO RADIATOR ASSEMBLIES ITEMS 14, 15, 16, AND 17. EACH 15 TO BE ATTACHED TO THE TOP OF THE MAST ON ONE END AND AN ANCHOR BOLT ON THE OTHER. STARTING WITH REEL 1, ATTACH THE WIRE LOOP NEAREST THE PIGTAIL TO THE SMALL SNAP HOOK ATTACHED TO THE INSULATORS AT THE TOP OF THE MAST. STRETCH OUT THE WIRE ON THE REEL ALONG THE MAST UNTIL THE END OF THE WIRE IS REACHED. REPEAT WITH THE SECOND WIRE ON THIS REEL AND THE TWO WIRES ON REEL 2, ATTACHING ONE WIRE LOOP TO EACH OF THE FOUR INSULATORS AT THE TOP OF THE MAST. ATTACH THE FOUR PIGTAILS TO THE FOUR MOUNTING SCREWS ON THE TERMINAL PLATE ON THE BOTTOM OF THE BALUN BOX. SEE DETAIL D-D ON SHEET 3.
10. REMOVE THE RG 8/U COAX FROM THE EQUIPMENT BAG. ATTACH ONE END TO THE BALUN AT THE TOP PLATE. ATTACH THE OTHER END TO THE FITTING ON THE BOTTOM MAST SECTION, ITEM 7.
11. ATTACH THE MAST GROUND WIRE, PART OF ITEM 5, TO THE GROUND CLAMP ON THE GROUND STAKE, ITEM 28. ATTACH THE GROUND WIRE AND COAXIAL CABLE, ITEM 24, TO THE MAST USING THE STRAPS ON EACH MAST SECTION.
12. ATTACH ERECTION ROPE ITEM 21 TO LOWER HANDLE ASSEMBLY, 11.
13. ERECT THE MAST TO ITS INTERMEDIATE POSITION BY GUIDING AND LIFTING THE TOP OF THE MAST TOWARD THE CENTER WHILE GUIDING AND ERECTING THE LOWER PART OF THE MAST. TAKE CARE NOT TO ENTANGLE THE CURTAIN LINES. THE SIDE GUY LINES PREVENT THE MAST FROM FALLING TO EITHER SIDE (DETAIL 5). WHEN THE MAST IS ERECT IN THE INTERMEDIATE POSITION (DETAIL 6), STRETCH OUT AND TIE DOWN THE FORWARD AND AFT GUY ROPES AS BEFORE. ADJUST ALL FOUR GUY ROPES FOR PROPER TENSION AND MAST STRAIGHTNESS.
14. COMPLETELY ERECT THE MAST BY PULLING THE ERECTION ROPE UNTIL THE HANDLE CAN BE REACHED (DETAIL 7 AND 8). THE TOP OF THE MAST SHOULD BE GUIDED, BY HAND, AS HIGH AS POSSIBLE SO THAT THE BALUN DOES NOT TANGLE IN CURTAIN OR GUY ROPES. CONTINUE TO ERECT THE MAST UNTIL THE HANDLE IS IN CONTACT WITH THE LOWER PART OF THE MAST. ENGAGE THE LOCKING CLAMP ASSEMBLY AND SECURE THE HANDLE IN THE "UP" POSITION AGAINST THE MAST.

(NOTES CONTINUED ON SHT. 2)

QUANTITY REQUIRED PER DASH NUMBER		TCI PART NUMBER	DESCRIPTION	ITEM NO.
			PARTS LIST	

NEXT ASSY | USED ON | APPLICATION

MATERIAL | FINISH

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN FEET (METERS)

TOLERANCES: DEC .X ± DEC .XX ± DEC .XXX ± FRACTIONS ± ANGLES ±

DO NOT SCALE DRAWING

	NAME	DATE
DRAWN	VICTOR GUTIERREZ	3/A:84
CHECK	[illegible]	12-20-84
APPROVAL	[illegible]	12-21-84
APPROVAL	REP	4/12/85

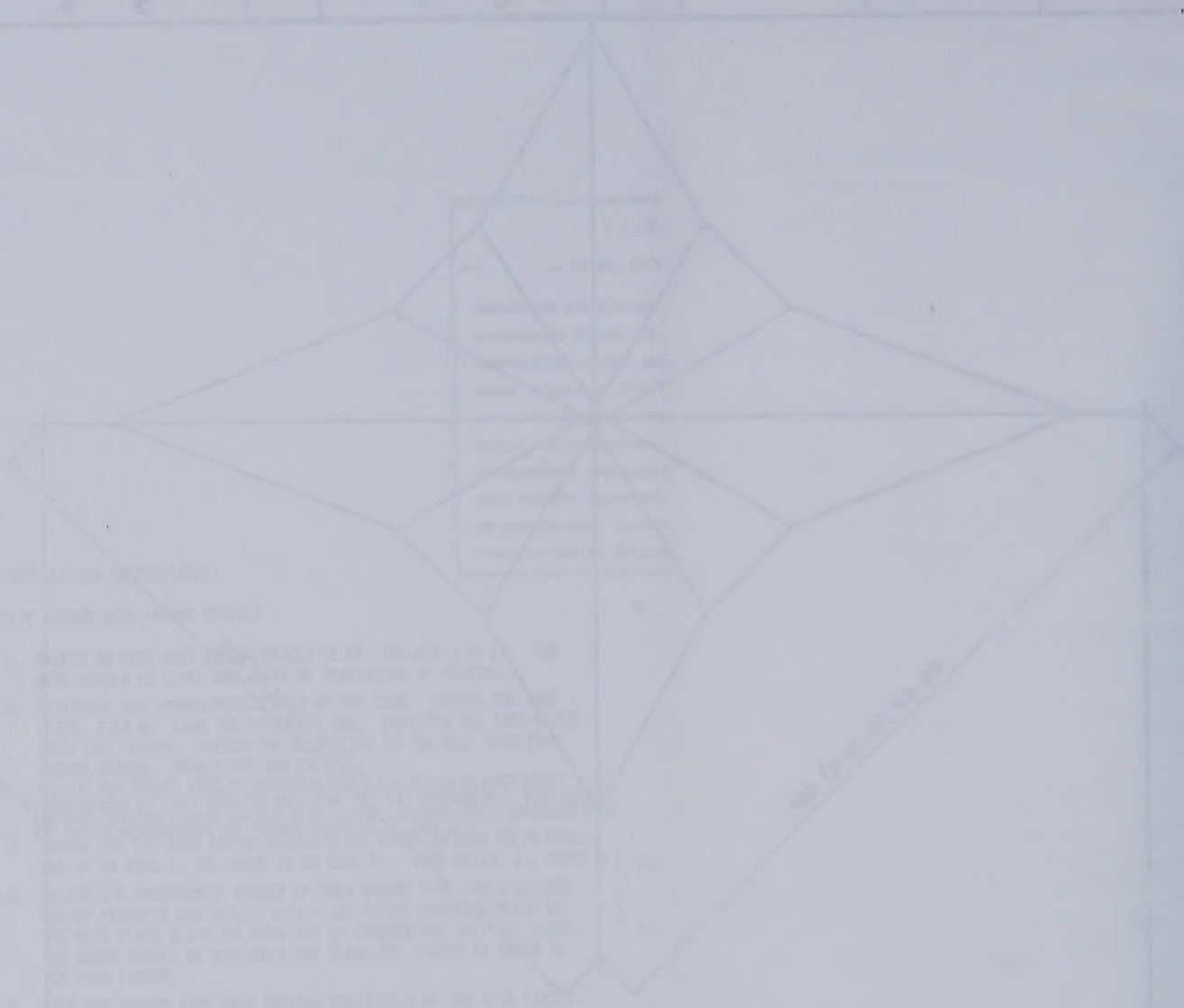
TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA

TITLE: ANTENNA INSTALLATION MODEL 65IT-I-35 TRANSPORTABLE

SIZE	FSCM NO.	DWG NO.
D	30103	589-ANT-00T

SCALE NONE | RELEASE DATE | SHEET 1 OF 5

DWG NO. 589-ANT-00T REV E



REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

VE THE FOUR CATENARY ROPES, ITEM 22, WITH SNAP HOOKS AND CURTAIN TENSIONING ROPES, ITEM 23 FROM BAG.

IGHTEN OUT THE FOUR PAIRS OF CURTAIN LINES HANGING FROM THE PLATE. NOTE THE ORIENTATION OF EACH. ATTACH THE FOUR HARY LINES, ITEM 22, TO THE LOOPS ON EACH ADJACENT CURTAIN HAT THE FOUR CATENARY ROPES ATTACH THE FOUR CURTAIN ASSEMBLIES ND THE MAST. (SEE PLAN VIEW.) DO NOT ATTACH CATENARIES EEN THE LEGS OF THE SAME PAIR OF LINES.

TCH OUT EACH RADIATOR [illegible] AND ATTACH TO THE ANCHORS AS THE GUY LINES (ONE RADIATOR PAIR AT EACH ANCHOR). CERTAIN THAT THE CURTAIN IS NOT TWISTED AROUND THE MAST.

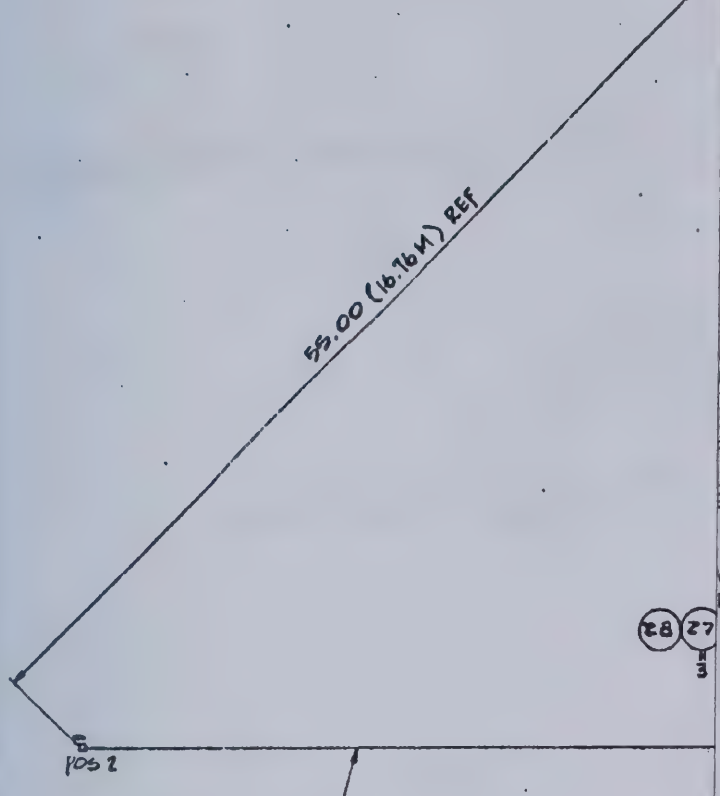
NCH THE CURTAIN TENSIONING ROPES, ITEM 23 AS WN IN DETAIL 11. SHT. 4 THE ROPE SHOULD BE LOOPED U THE SNAP HOOK ATTACHED TO THE ANCHOR EYE D HOOKED INTO THE SNAP HOOK. WRAP THE MIDDLE THE ROPE AROUND THE SNAP TO FORM AN ADJUSTABLE P. (SEE SHT. 4 DET. 11) ADJUST ALL GUYS AND CURTAIN ES TO STRAIGHTEN MAST AND EQUALIZE TENSION.

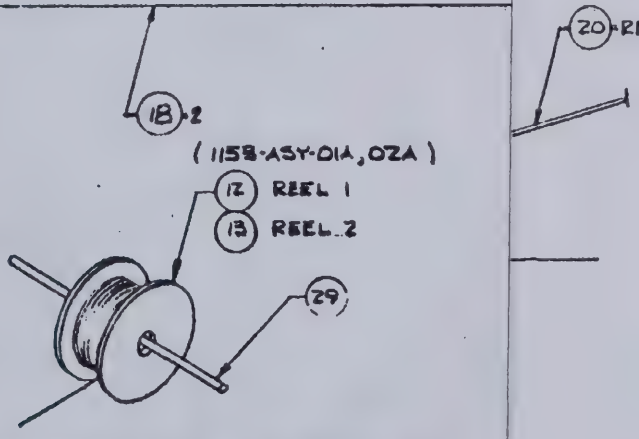
ACH THE CLAMP ON THE GROUND WIRES, ITEM 18, CH WERE LEFT ON THE GROUND IN STEP 6, TO THE RE LOOPS AT THE JUNCTION OF THE RADIATOR ROPE TENSIONER. THE LOOPS SHOULD BE ATTACHED THE SNAP HOOK AT THE END OF THE CURTAIN SIONING ROPES, ITEM 23. TIGHTEN THE WING NUT. PEAT AT EACH ANCHOR POSITION. SEE DET. 10, SHT. 4

ANTENNA IS NOW READY TO BE CONNECTED TO POWER SOURCE.

LOWERING AND DISASSEMBLY

VERSE THE ERECTION PROCEDURE. NOTE THE TENNA WIRES' ORDER ONTO THE REELS, SHEET 2.





ANTENNA WIRE REEL & ELEMENT BAG ITEM (31)				
ORDER OFF REEL 1	PART NO	QTY	ITEM NO	ORDER ONTO REEL 1
1	424-WIR-01A	1	18	3
2	512-RAD-01A	1	14	2
3	517-RAD-02A	1	15	1
ORDER OFF REEL 2	PART NO	QTY	ITEM NO	ORDER ONTO REEL 2
1	424-WIR-01A	1	18	3
2	512-RAD-03A	1	16	2
3	517-RAD-04A	1	17	1
-	427-WIR-01A	1	19	-
-	865-GUY-01A	4	20	-
-	021-TIE-01A	4	28	-
-	253-CBL-01A	1	24	-
-	1046-ASY-01A	1	6	-
-	865-GUY-03A	1	21	-
-	489-CAT-01A	1	22	-

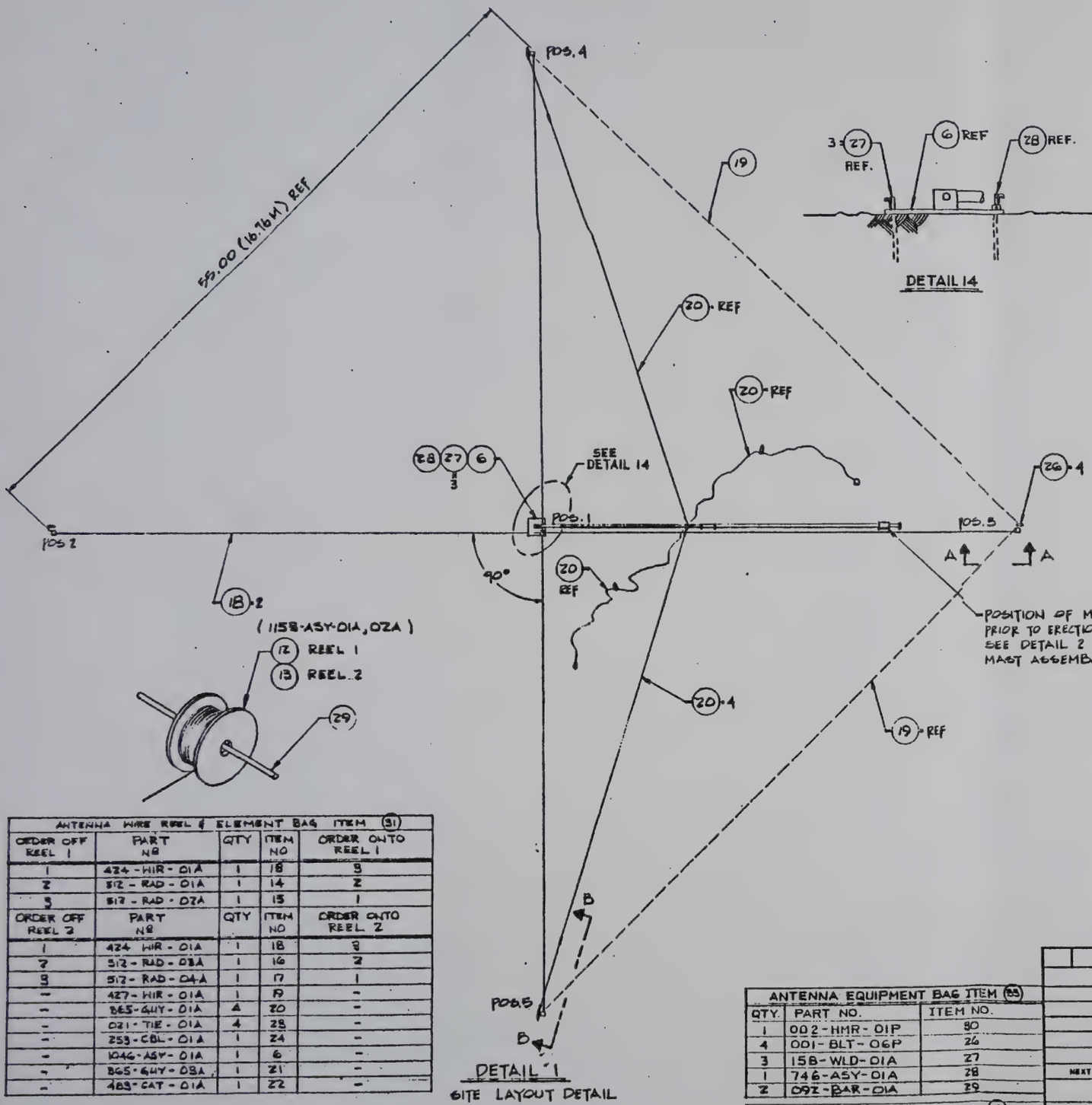
DETAIL 13

PART NUMBER	DESCRIPTION	ITEM NO.
	PARTS LIST	

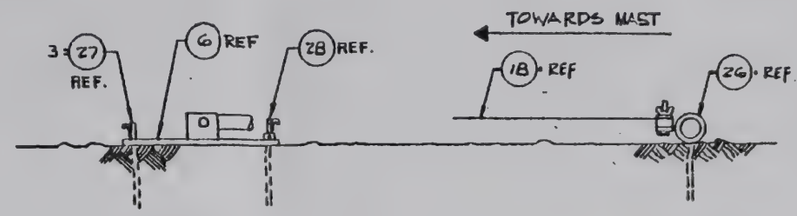
DATE	TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA	
DATE 12-20-84	TITLE ANTENNA INSTALLATION	
DATE 12-21-84	MODEL 651T-1-35 TRANSPORTABLE	
DATE	SIZE D · FSCM NO. 30103 · DWG NO. 589-ANT-00T	
CALE DRAWING	SCALE NONE · RELEASE DATE · SHEET 2 OF 5	

REV. E · DWG NO. 589-ANT-00T

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

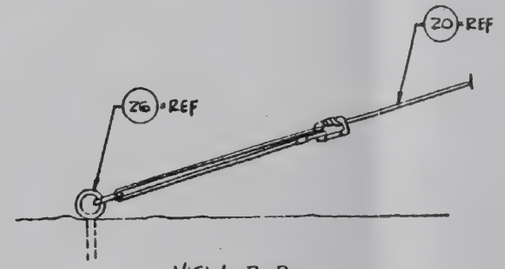


DETAIL 1
SITE LAYOUT DETAIL



DETAIL 14

VIEW A-A
TYPICAL 4 PLACES
USE LAYOUT WIRE ITEM 19 IN CONJUNCTION WITH GROUND WIRE ITEM 18 TO LOCATE POS. 4 AND POS. 5 REFER TO NOTE b



VIEW B-B
TYPICAL GUY RIGGING
4 PLACES

ANTENNA WIRE REEL & ELEMENT BAG ITEM (31)				
ORDER OFF REEL 1	PART NO	QTY	ITEM NO	ORDER ONTO REEL 1
1	424-WIR-01A	1	18	3
2	512-RAD-01A	1	14	2
3	517-RAD-02A	1	15	1
ORDER OFF REEL 2	PART NO	QTY	ITEM NO	ORDER ONTO REEL 2
1	424 WIR-01A	1	18	3
2	512-RAD-03A	1	16	2
3	517-RAD-04A	1	17	1
-	427-WIR-01A	1	19	-
-	365-GUY-01A	4	20	-
-	021-TIE-01A	4	25	-
-	253-CBL-01A	1	24	-
-	1046-ASY-01A	1	6	-
-	365-GUY-03A	1	21	-
-	489-CAT-01A	1	22	-

DETAIL 13

ANTENNA EQUIPMENT BAG ITEM (33)		
QTY.	PART NO.	ITEM NO.
1	002-HMR-01P	30
4	001-BLT-06P	26
3	158-WLD-01A	27
1	746-ASY-01A	28
2	092-BAR-01A	29

ANTENNA BALUN BAG ITEM (32)		
QTY.	PART NO.	ITEM NO.
1	1041-ASY-01A	5

15. REMOVE THE FOUR CATENARY ROPES, ITEM 22, WITH SNAP HOOKS AND FOUR CURTAIN TENSIONING ROPES, ITEM 23 FROM BAG.
16. STRAIGHTEN OUT THE FOUR PAIRS OF CURTAIN LINES HANGING FROM THE TOP PLATE. NOTE THE ORIENTATION OF EACH. ATTACH THE FOUR CATENARY LINES, ITEM 22, TO THE LOOPS ON EACH ADJACENT CURTAIN SO THAT THE FOUR CATENARY ROPES ATTACH THE FOUR CURTAIN ASSEMBLIES AROUND THE MAST. (SEE PLAN VIEW.) DO NOT ATTACH CATENARIES BETWEEN THE LEGS OF THE SAME PAIR OF LINES.
17. STRETCH OUT EACH RADIATOR [illegible] AND ATTACH TO THE SAME ANCHORS AS THE GUY LINES (ONE RADIATOR PAIR AT EACH ANCHOR). MAKE CERTAIN THAT THE CURTAIN IS NOT TWISTED AROUND THE MAST. ATTACH THE CURTAIN TENSIONING ROPES, ITEM 23 AS SHOWN IN DETAIL 11, SHT. 4 THE ROPE SHOULD BE LOOPED THRU THE SNAP HOOK ATTACHED TO THE ANCHOR EYE AND HOOKED INTO THE SNAP HOOK. WRAP THE MIDDLE OF THE ROPE AROUND THE SNAP TO FORM AN ADJUSTABLE LOOP. (SEE SHT. 4 DET. 11) ADJUST ALL GUYS AND CURTAIN WIRES TO STRAIGHTEN MAST AND EQUALIZE TENSION.
18. ATTACH THE CLAMP ON THE GROUND WIRES, ITEM 18, WHICH WERE LEFT ON THE GROUND IN STEP 6, TO THE BARE LOOPS AT THE JUNCTION OF THE RADIATOR AND ROPE TENSIONER. THE LOOPS SHOULD BE ATTACHED TO THE SNAP HOOK AT THE END OF THE CURTAIN TENSIONING ROPES, ITEM 23. TIGHTEN THE WING NUT. REPEAT AT EACH ANCHOR POSITION. SEE DET. 10, SHT. 4
19. THE ANTENNA IS NOW READY TO BE CONNECTED TO THE POWER SOURCE.

LOWERING AND DISASSEMBLY

1. REVERSE THE ERECTION PROCEDURE. NOTE THE ANTENNA WIRES' ORDER ONTO THE REELS, SHEET 2.

QUANTITY REQUIRED PER DASH NUMBER		TCI PART NUMBER	DESCRIPTION	ITEM NO.
			PARTS LIST	

NEXT ASSY | USED ON | APPLICATION

MATERIAL | FINISH

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN FEET (METERS)

TOLERANCES: DEC .X ± DEC .XX ± DEC .XXX ± FRACTIONS ± ANGLES ±

DO NOT SCALE DRAWING

DRAWN	Hugo Carrasco	DATE
CHECK	[illegible]	DATE 12-20-84
APPROVAL	[illegible]	DATE 12-21-84
APPROVAL		DATE

TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA

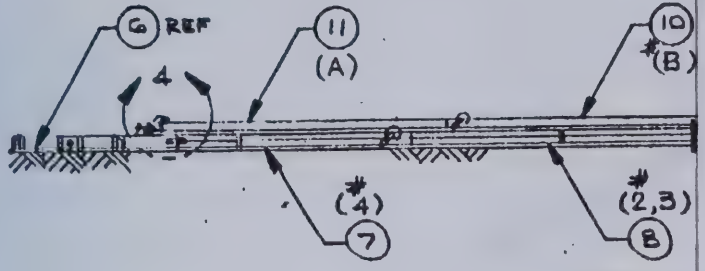
TITLE: ANTENNA INSTALLATION
MODEL 65IT-1-35 TRANSPORTABLE

SIZE	FSCM NO.	DWG NO.
D	30103	589-ANT-00T

SCALE NONE | RELEASE DATE | SHEET 2 OF 5

REV. E | DWG NO. 589-ANT-00T

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

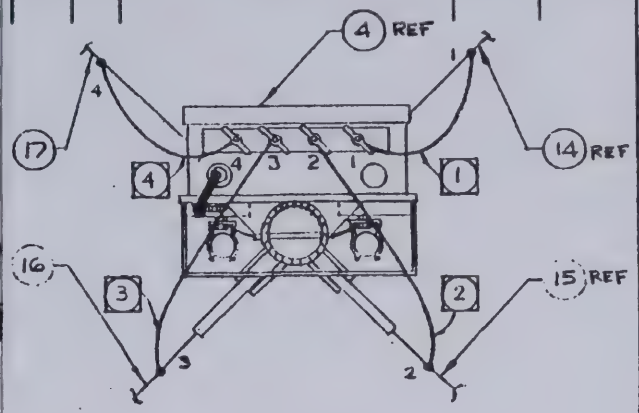


DETAIL

MAST ASSEMBLY AND CURTAIN NOT CLARITY. SEE DE NOTE 9 FOR CUR ATTACHMENT.

(*4) INDICATES MAST ASSEMBLY ORDER

INDICATES UP DIRECTION

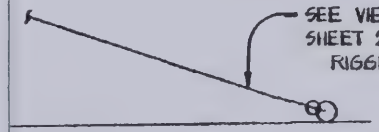


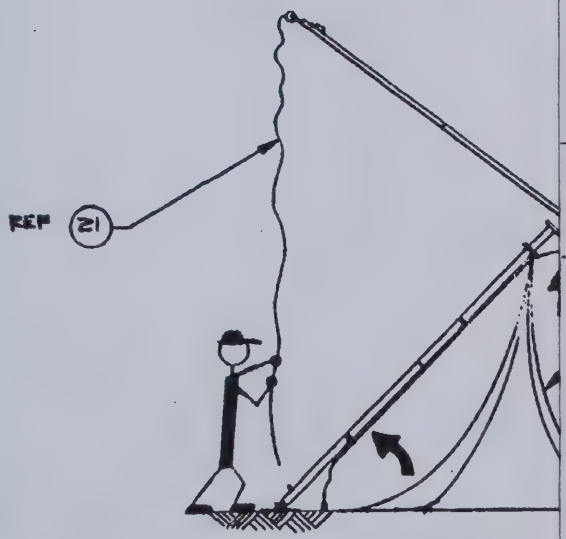
VIEW D-D

JUMPER WIRE ATTACHMENT. ADJACENT RADIATORS MUST BE CONNECTED TO BALUN IN SEQUENCE SHOWN 1, 2, 3, 4.

REF.

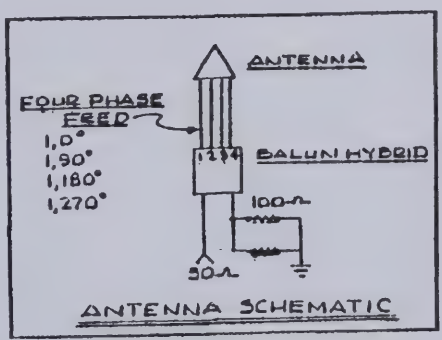
REF.





DETAIL 5

INITIAL LIFTING F
REFER TO NOTE



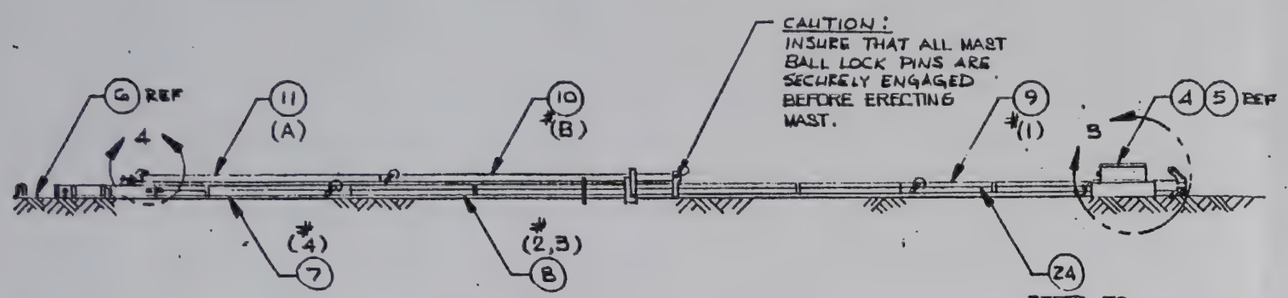
ANTENNA SCHEMATIC

PART NUMBER	DESCRIPTION	ITEM NO.

PARTS LIST

DATE 3/4/85	TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA	
DATE 12-20-84	TITLE ANTENNA INSTALLATION	
DATE 12-21-84	MODEL 651T-1-35 TRANSPORTABLE.	
DATE	SIZE D / FSCM NO. 30103 / DWG NO. 589-ANT-001	
CALE DRAWING	SCALE NONE / RELEASE DATE / SHEET 3 OF 5	

REV. E | DWG NO. 589-ANT-001

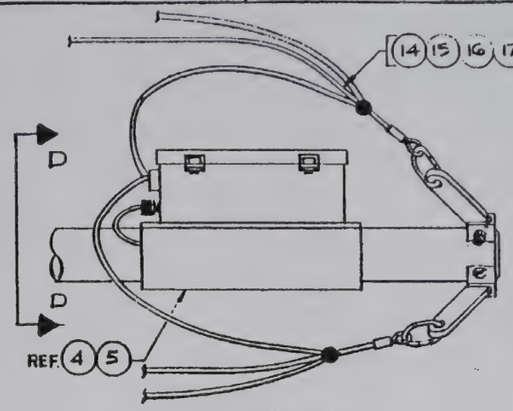


DETAIL 2

MAST ASSEMBLY GUY ROPES AND CURTAIN NOT SHOWN FOR CLARITY. SEE DETAIL 3 AND NOTE 9 FOR CURTAIN ATTACHMENT.

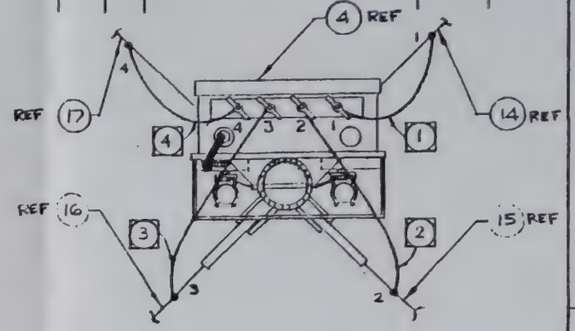
(4) INDICATES MAST ASSEMBLY ORDER

INDICATES UP DIRECTION



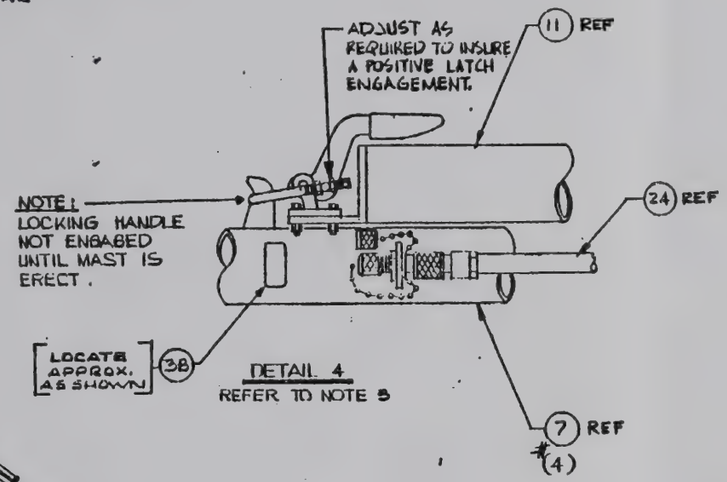
DETAIL 3

REFER TO NOTE 9



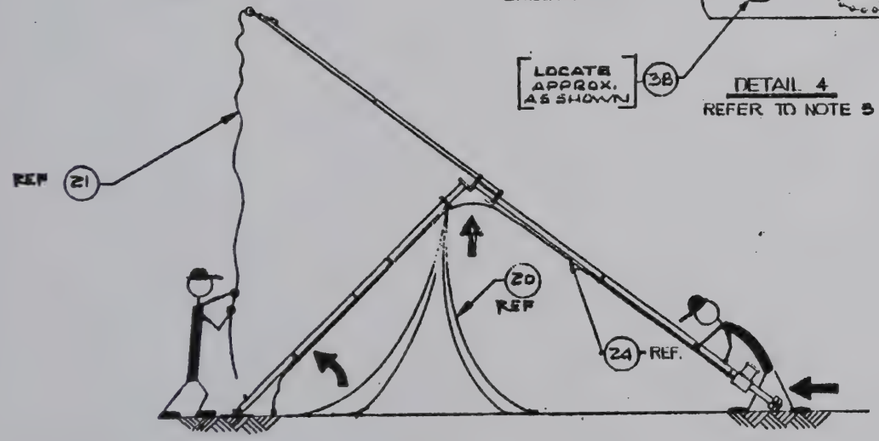
VIEW D-D

JUMPER WIRE ATTACHMENT. ADJACENT RADIATORS MUST BE CONNECTED TO BALUN IN SEQUENCE SHOWN 1, 2, 3, 4.



DETAIL 4

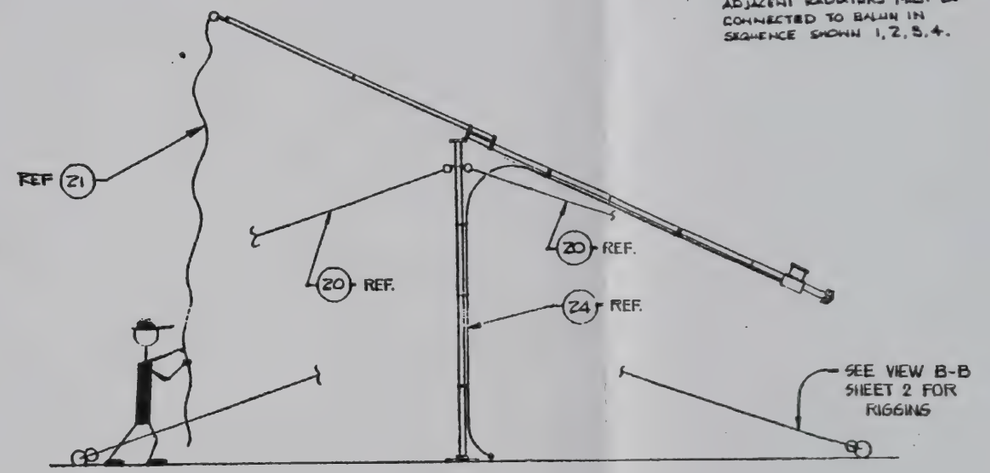
REFER TO NOTE 5



DETAIL 5

INITIAL LIFTING POSITION

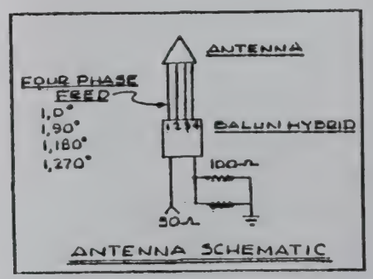
REFER TO NOTE 13



DETAIL 6

INTERMEDIATE POSITION OF MAST

REFER TO NOTE 13



ANTENNA SCHEMATIC

QUANTITY REQUIRED PER DASH NUMBER		TCI PART NUMBER	DESCRIPTION	ITEM NO.
			PARTS LIST	

MATERIAL

FINISH

NEXT ASSY | USED ON

APPLICATION

DRAWN V. GRIEPPO 8/20/84

CHECK 12-20-84

APPROVAL C.A. Watterson 12-21-84

APPROVAL DATE

THIRD ANGLE PROJECTION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES

TOLERANCES: DEC .XX ±.01 DEC .XXX ±.005 DEC .XXXX ±.0005 FRACTIONS ±1/64 ANGLES ±1°

DO NOT SCALE DRAWING

TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA

TITLE: ANTENNA INSTALLATION

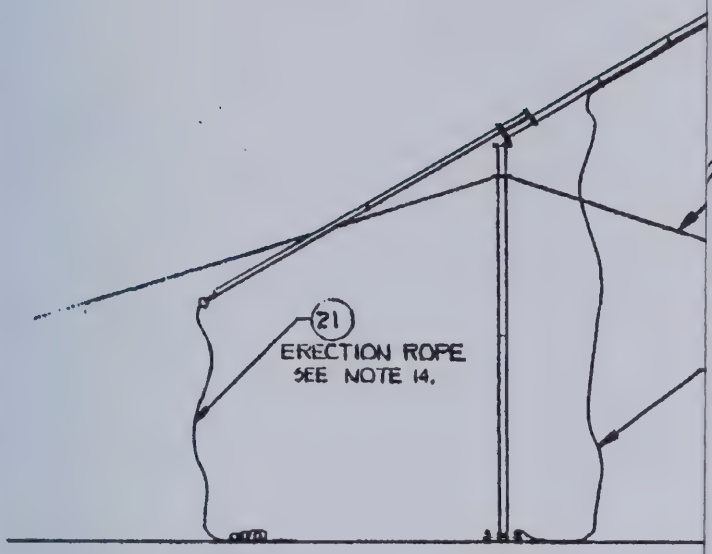
MODEL 651T-1-35 TRANSPORTABLE.

SIZE D | FSCM NO. 30103 | DWG NO. 589-ANT-001

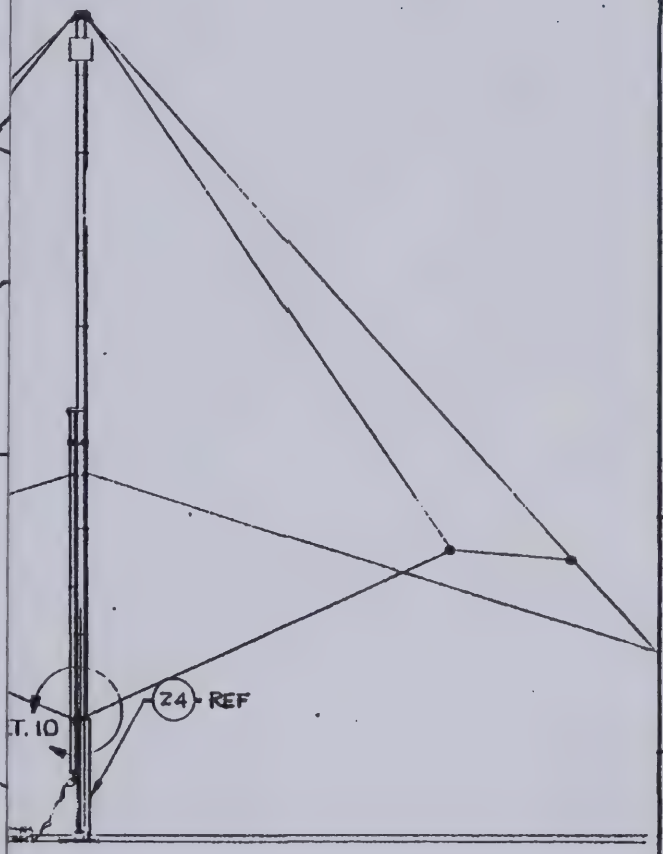
SCALE NONE | RELEASE DATE | SHEET 3 OF 5

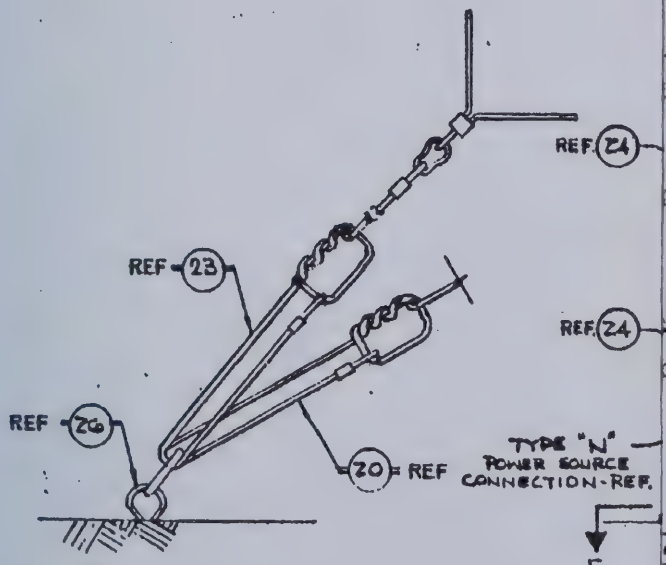
REV E | DWG NO. 589-ANT-001

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



DETAIL 7
REFER TO NOTE 14.





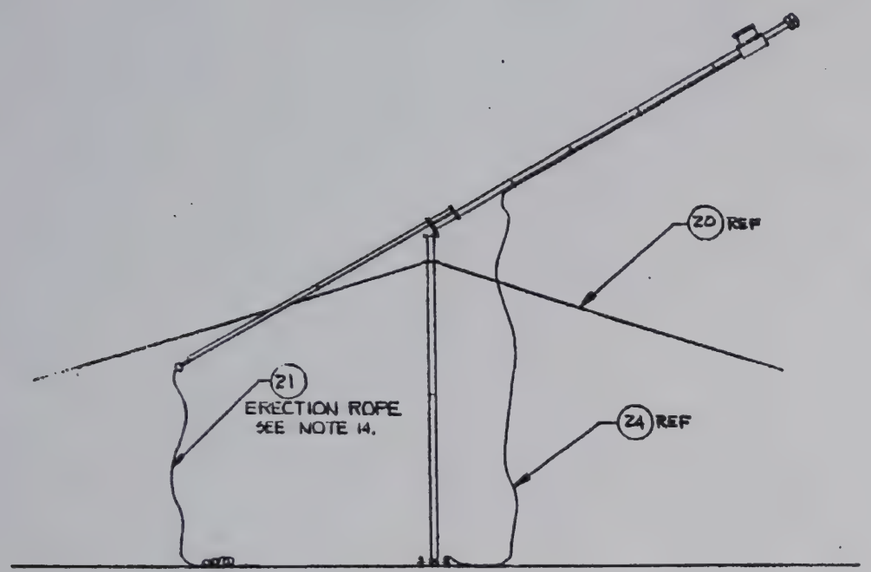
DETAIL 11

IL 8
ERECT MAST
OTES 14 THRU 18

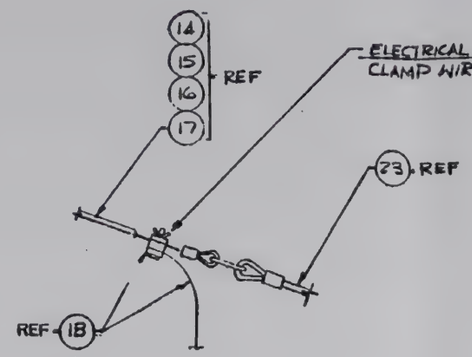
E 589-ANT-001

PART NUMBER	DESCRIPTION	ITEM NO.
	PARTS LIST	

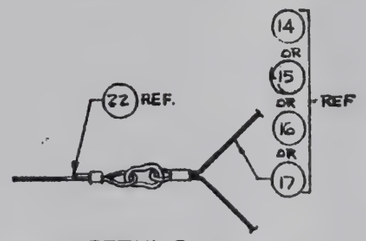
DATE RIKS 12/19/84	TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA	
DATE 12-21-84	TITLE ANTENNA INSTALLATION MODEL 651T-1-35 TRANSPORTABLE	
DATE 12-21-84	SIZE D FSCM NO. 30103 DWG NO. 589-ANT-001	
DATE	SCALE NONE RELEASE DATE SHEET 4 OF 5	
CALE DRAWING		



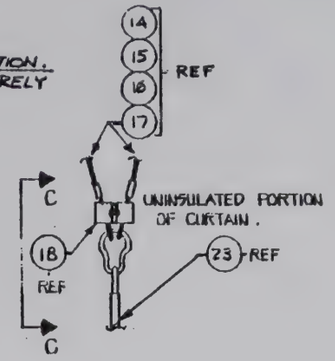
DETAIL 7
REFER TO NOTE 14.



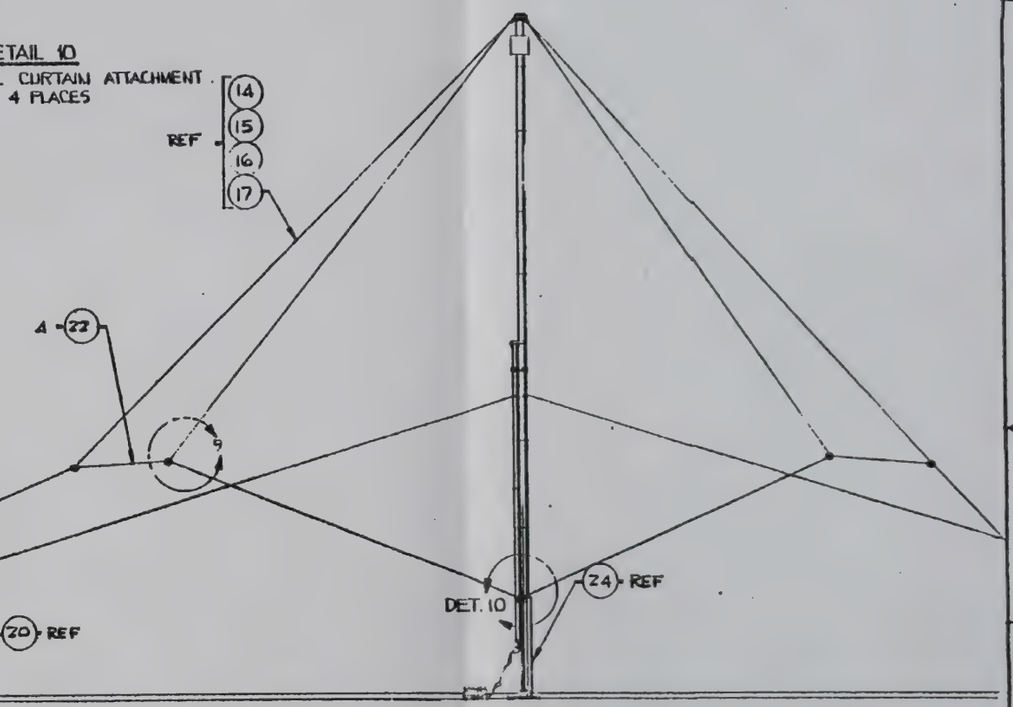
VIEW C-C



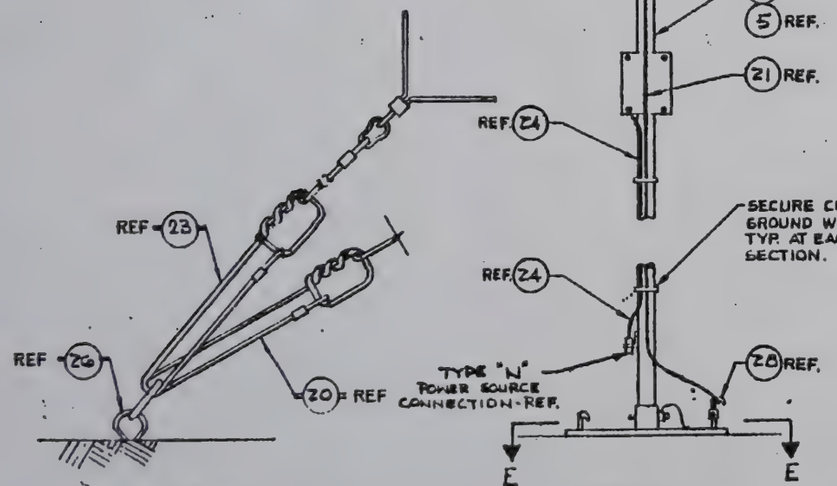
DETAIL 9
TYPICAL CATENARY ATTACHMENT
8 PLACES



DETAIL 10
TYPICAL CURTAIN ATTACHMENT
4 PLACES

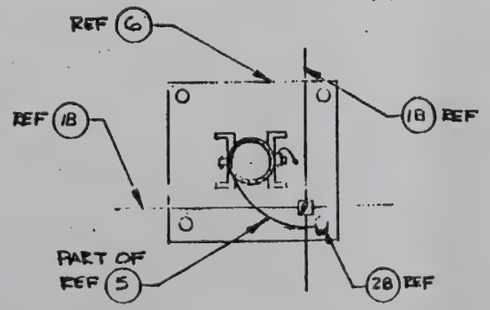


DETAIL 8
COMPLETELY ERECT MAST
REFER TO NOTES 14 THRU 18



DETAIL 11

DETAIL 12
MAST GROUNDING



VIEW E-E

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

QUANTITY REQUIRED PER DASH NUMBER		TCI PART NUMBER	DESCRIPTION	ITEM NO.
			PARTS LIST	
NEXT ASSY	USED ON	MATERIAL	DRAWN R.E. HENDRIKS 12/19/84	TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA
APPLICATION		FINISH	CHECK 12-21-84	TITLE ANTENNA INSTALLATION MODEL 651T-1-35 TRANSPORTABLE
THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN	TOLERANCES: DEC .X ± DEC .XX ± DEC .XXX ± FRACTIONS ± ANGLES ±	APPROVAL 12-21-84 APPROVAL DATE	SIZE D FSCM NO. 30103 DWG NO. 589-ANT-00T
			DO NOT SCALE DRAWING	SCALE NONE RELEASE DATE SHEET 4 OF 5

REV. E DWG NO. 589-ANT-001

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

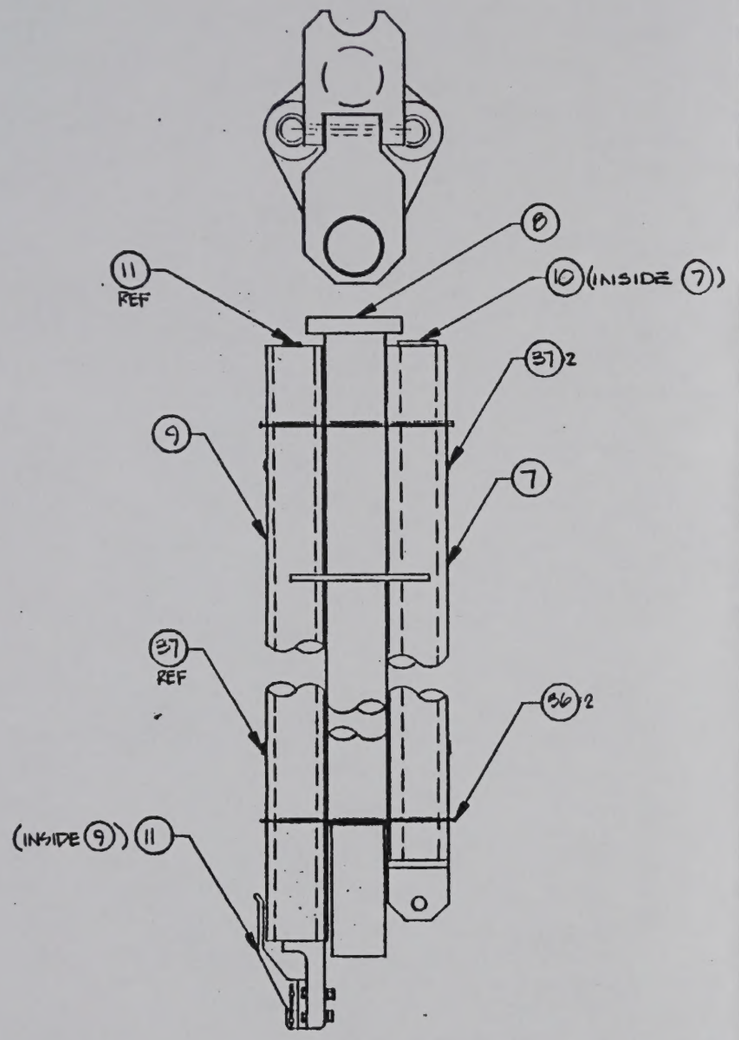
(INSI

DWG NO. 589-ANT-1

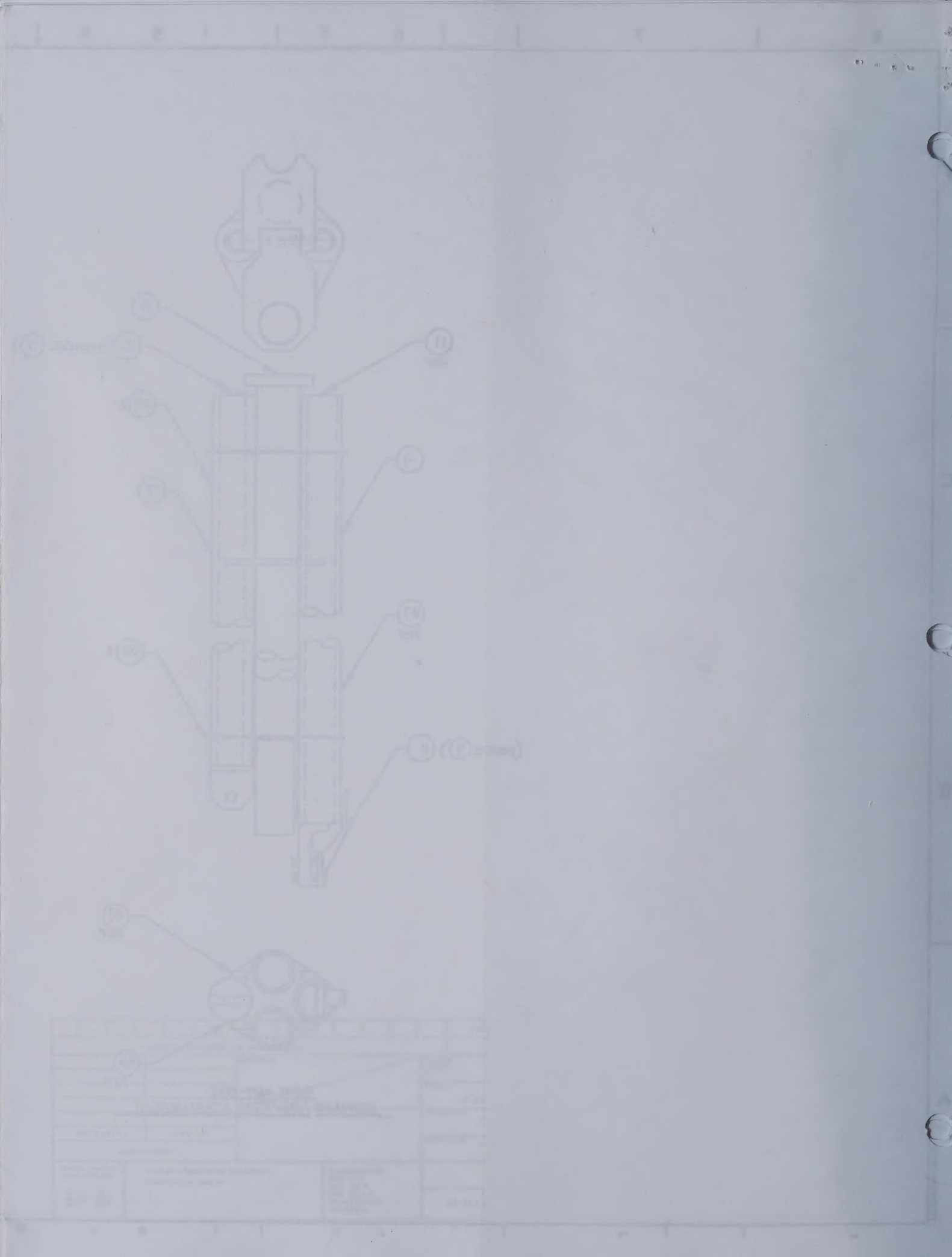
PART NUMBER	DESCRIPTION	ITEM NO.
	PARTS LIST	

DATE 21MAY85	TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA			
DATE 5/23/85	TITLE ANTENNA INSTALLATION MODEL G5IT-I-35, TRANSPORTABLE			
DATE				
DATE				
	SIZE D	FSCM NO. 30103	DWG NO. 589-ANT-00T	REV E
CALE DRAWING	SCALE NTS	RELEASE DATE	SHEET 5 OF 5	

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED



589-ANT-03T
STOWAGE / SHIPPING ARRANGMENT

QUANTITY REQUIRED PER DASH NUMBER		TCI PART NUMBER	DESCRIPTION	ITEM NO.	
			PARTS LIST		
NEXT ASSY	USED ON	MATERIAL	DRAWN CMD	DATE 2/18/94	TCI TECHNOLOGY FOR COMMUNICATIONS INTERNATIONAL MOUNTAIN VIEW, CALIFORNIA
APPLICATION		FINISH	CHECK JC	DATE 5/25/95	TITLE ANTENNA INSTALLATION MODEL G5IT-1-35, TRANSPORTABLE
			APPROVAL	DATE	
			APPROVAL	DATE	
THIRD ANGLE PROJECTION	UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN	TOLERANCES: DEC .X ± DEC .XX ± DEC .XXX ± FRACTIONS ± ANGLES ±	DO NOT SCALE DRAWING		SIZE D FSCM NO. 30103 DWG NO. 589-ANT-00T REV E
					SCALE NTS RELEASE DATE SHEET 5 OF 5

589-ANT-00T
DWG NO.
REV